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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
LEUNG, JENNIFER A	

ART UNIT	PAPER NUMBER
1797	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,498	BOSCH ET AL.	
	Examiner	Art Unit	
	JENNIFER A. LEUNG	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *4,20 and 23-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *4,20 and 23-31* is/are rejected.

7)☒ Claim(s) *4 and 26-31* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment field on May 12, 2008 has been carefully considered. Claims 1-3, 5-19, 21 and 22 are cancelled. Claims 26-31 are newly added. Claims 4, 20 and 23-31 are under consideration.

Claim Objections

2. Claims 4 and 26-31 are objected to because of the following informalities:

In claim 4, line 5: --the-- should be inserted before "outlet" and "inlet", respectively.

In claim 4, line 6: "in" should be changed to --is--.

In claim 26, line 1, and in claim 27, line 1: "the tube in the reactor has" should be changed to --the tubes in the reactor have--, since plural tubes are set forth under claim 4, line 3.

In claim 28, line 1, and in claim 29, line 1: "the tube contains" should be changed to --the tubes contain--, since plural tubes are set forth under claim 4, line 3.

In claim 30, line 1, and in claim 31, line 1: "the tube is" should be changed to --the tubes are--, since plural tubes are set forth under claim 4, line 3.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 26, 27, 29 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 26 and 27, it is unclear as to the structural limitation Applicant is attempting to recite by "a geometry chosen so that the temperature distribution in the fixed catalyst bed is uniform and such that the difference between the outlet temperature and the inlet temperature of the reactor is less than 35 ℃", because it is unclear as to the "geometry" being implied by the limitation. Claims 29 and 31 are rejected for being dependent from claim 27.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 4, 20, 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruppel et al. (EP 0 534 195) in view of Hamilton (US 3,384,667).

Regarding claims 4, 28 and 30, Ruppel et al. (see FIGs. 1, 2; English Abstract and Machine Translation) discloses a reactor suitable for conducting the reaction of C_{1-4} alkanols with ammonia for preparing alkyamines (i.e., *Herstellung von Methylaminen aus Methanol und Ammoniak*, translated as the production of methylamine from methanol and ammonia; see

column 1, lines 4-20; column 4, lines 24-37 and claim 20), the reactor comprising:

a fixed bed of catalyst **01**, present as a single contiguous fixed bed (i.e., located within the reactor, in the space between the annular distributor **07** and the collecting pipe **10**); and

interior tubes through which a coolant may pass (i.e., tubes **03** of heat exchanger tube bank **02**, with coolant, e.g., water, passing from distributor **04** to collector **05**), wherein the tubes **03** are in a coil form (see figures).

The apparatus of Ruppel et al. is the same as the instantly claimed apparatus, except that Ruppel et al. is silent as to the fixed bed of catalyst **01** comprising a "shape-selective" catalyst.

Hamilton teaches a catalyst suitable for producing alkylamines from the reaction of ammonia with alcohol (see abstract; column 1, lines 37-45), wherein the catalyst comprises a "shape-selective" catalyst including natural or synthetic crystalline aluminosilicates or zeolites, such as clinoptilolite, ferrierite, chabazite, mordenite, Y-zeolite, etc. (see column 2, lines 33-61).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to select the shape selective catalyst taught by Hamilton for the catalyst **01** in the apparatus of Ruppel et al., because the shape selective catalyst of Hamilton would have been considered a conventional catalyst in the art for catalyzing the reaction of methanol and ammonia for the production of methylamine, and furthermore, the shape selective catalyst of Hamilton advantageously controls the reaction to favor the formation of mono- and di-substituted amine products, which are commercially preferred over the tri-substituted amine products (see column 1, lines 45-67).

The recitations with respect to the coolant, wherein "cooling is carried out by means of boiling water cooling such that the difference between outlet temperature and inlet temperature

of the reactor in less than 35 ºC" (claim 4) and "the tube contains boiling water as a coolant" (claim 28), do not impart patentable weight to the claims, since the coolant is not considered an element of the apparatus, and the difference between the inlet and outlet temperatures of the reactor and the particular phase of the water coolant (i.e., boiling) are considered process limitations. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim. *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969). Furthermore, inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. *In re Young*, 75 F.2d 966, 25 USPQ 69 (CCPA 1935); *In re Otto*, 312 F.2d 937, 136 USPQ 458, 459 (CCPA 1963). A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art.

Regarding claim 20, the recitation that "monomethylamine and dimethylamine are prepared from the reactor" adds no further patentable weight to the claim, since the monomethylamine and dimethylamine, i.e., products of the reaction, are not considered elements of the apparatus. In any event, Ruppel et al. discloses that the reactor is structurally capable of producing methylamine, and Hamilton teaches that the shape-selective catalyst preferentially catalyzes the production of mono- and di-substituted amines (see comments above).

5. Claims 23-27, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruppel et al. (EP 0 534 195) in view of Hamilton (US 3,384,667), as applied to claim 4 above, and further in view of Lahne et al. (US 4,339,413).

Regarding claims 23-25, Ruppel et al. discloses that the reactor comprises interior tubes

03, but does not specifically state that the tubes have a cross section which does not have any corners, e.g., a circular or ellipsoidal cross-sectional shape, or that the tubes have a cross-sectional diameter from 1 to 5 cm.

Lahne et al. teaches a reactor (see FIG. 1) containing a fixed bed of catalyst **4** and interior tubes **5** through which a coolant may pass. The tubes (designated as **13** in FIG. 2) have a circular cross section and a cross-sectional diameter from 1 to 5 cm (i.e., the internal diameter **14** of the tubes **13** is between 4 and 50 mm, and preferably between 10 and 30 mm; see column 4, line 63 to column 5, line 8).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the tubes in the modified apparatus of Ruppel et al. to comprise a circular cross-section and a cross-sectional diameter between 1 and 5 cm, because the configuration would have been considered conventional in the art, as evidenced by Lahne et al., and hence, no cause for patentability here. Applicant further acknowledges that suitable dimensions of the tubes for the coolant are known to those skilled in the art (see specification, page 4, lines 33-34). In addition, said tube configuration would have provided efficient cooling of the fixed catalyst bed, while still allowing for the reactor to be made comparatively small, as taught by Lahne et al. (see, e.g., column 1, line 67 to column 2, line 25).

Regarding claims 26 and 27, as defined in Applicant's specification,

> "… the tubes can have any suitable or desired *geometry*. The tubes preferably have a cross section which does not have any corners. For example, the tube cross section can be circular or ellipsoidal. The tube diameter is preferably from 1 to 5 cm." (see page 4, lines 3-6).
>
> "The *geometry* of the arrangement of the coolant tubes in the reactor can be chosen

> freely, as long as efficient heat removal is achieved. The *geometry* is preferably chosen so that the temperature distribution in the fixed catalyst bed is very uniform. The design and operation of are preferably such that the difference between outlet temperature and inlet temperature of the reactor is less than 60 °C, particularly preferably less than 35 °C." (see page 4, lines 23-27).

Because the geometry of the tubes in the modified apparatus of Ruppel et al. appears to be the same as Applicant's disclosed geometry (i.e., the tubes do not have any corners, and the tubes have a diameter from 1 to 5 cm, for efficient cooling of the fixed catalyst bed; see comments with respect to claims 23-25 above), and because the tubes in the modified apparatus of Ruppel et al. are provided along the entire length of the catalyst bed (see figures), the Examiner asserts that the modified apparatus of Ruppel et al. would be structurally capable of providing a uniform temperature distribution in the fixed catalyst bed, and producing the temperature difference between the inlet and outlet of the reactor as claimed.

Regarding claims 29 and 31, as reiterated from above, the modified apparatus of Ruppel et al. structurally meets the claims, since the recitations with respect to the coolant do not impart patentable weight to the claims. Please note that the coolant is not considered an element of the apparatus, and the phase of the water coolant (i.e., boiling) is considered a process limitation. Expressions relating the apparatus to contents thereof during an intended operation are of no significance in determining patentability of the apparatus claim, and the inclusion of a material or article worked upon by a structure being claimed does not impart patentability to the claims. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art.

Response to Arguments

6. Applicant's arguments filed May 12, 2008 have been fully considered but they are not persuasive. Applicant, in summary, argues that "the coolant is a feature which belongs to the reactor and which does not belong to the process which is conducted in this reactor", and "the temperature difference between inlet and outlet temperature of the reactor is... not a process limitation, but a reactor limitation, because... this feature makes it possible to create a reactor which has an improved lifetime and which gives rise to an improved surrounding for conducting the reaction between methanol and ammonia." (see response, page 4, last paragraph, to page 5, fourth paragraph).

The Examiner respectfully disagrees. As stated above, the coolant is not considered an element of the apparatus, and the temperature or phase of the water coolant (i.e., boiling) is considered a process limitation. The coolant flows in and out of the apparatus, and it is merely a material being worked upon by the structure being claimed. Similarly, the temperature difference between the inlet and outlet of the reactor is considered a process limitation. The recited process limitations do not add further patentable weight (i.e., structure) to the apparatus claims. A recitation of the intended use of the apparatus must result in a structural difference between the claimed apparatus and the prior art in order to patentably distinguish the claimed apparatus from the prior art. See MPEP sections 2114 and 2115 for a discussion of apparatus claims and functional language in apparatus claims.

It is further noted that Applicant's specification specifically states that the Ruppel et al. apparatus is structurally capable of performed the intended use as claimed --

> "Suitable reactors are described, for example, in EP-A-0 534 195. They can be used, inter alia, for the preparation of methylamines from methanol and ammonia." (see page 4,

lines 7-9).

"Suitable reactor are, for example, Linde isothermal reactors or comparable nickel reactors as are also described in DE-A-34 14 717 and EP-A-0 534 195. They are usually operated isothermally." (see page 4, lines 29-31).

Therefore, the modified apparatus of Ruppel et al. structurally meets the claims.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571)272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/
Primary Examiner, Art Unit 1797